

REMARKS/ARGUMENTS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 23-30 are presently pending in this case.

In the outstanding Official Action, Claims 23-30 were rejected under 35 U.S.C. §103(a) as unpatentable over Li (U.S. Patent No. 6,654,429) in view of Mitra et al. (U.S. Patent No. 5,533,063, hereinafter “Mitra”).

With regard to the rejection of Claim 23 as unpatentable over Li in view of Mitra, that rejection is respectfully traversed.

Claim 23 recites in part:

a channel estimator configured to perform a channel estimation on the basis of received pilot symbols; and
a filter configured to perform a channel estimation for data symbols between pilot symbols, *said filter being selected from a set of filters based on an estimated carrier to interference ratio*, said estimated carrier being a wanted carrier power value at a frequency subcarrier and a timeslot of a data symbol to be channel estimated, and said interference value is an interference reference value.

Li describes a channel estimator in an OFDM system, in which pilot symbols are inserted at known positions in the time-frequency space. The received signal is subjected to a two-dimensional inverse Fourier transform, two-dimensional filtering, and a two-dimensional Fourier transform to recover the pilot symbols so as to estimate the channel response.¹ More specifically, the estimator includes a multiplier which calculates a noisy channel estimate from a received signal and a selected reference signal, whereby the selected reference signal is the known pilot symbols.² The noisy channel estimate is then assembled into a two-dimensional array, which is subjected to a two-dimensional inverse fast Fourier transformation (2-D IFFT), then filtered (diamond-shape filter 152) and then subjected to a

¹See Li, abstract.

²See Li, column 4, lines 35-44.

two-dimensional fast Fourier transformation (2-D FFT).³ The diamond filter 152 is used to filter out the additive noise corresponding to high Doppler and a high time delay. The area of the diamond is designed to match the maximum delay spread and Doppler frequency. Consequently, the estimation performance is insensitive to different delay profiles and Doppler frequencies and provides a robust estimator.⁴

Further, column 5, lines 14-22 of Li describes that from the initial pilot symbols the estimated channel parameters corresponding to the other positions (positions between the pilot symbols) are obtained by interpolation using a 2-D IFFT, filtering (This filtering is the filtering performed by the diamond-shaped filter 152), and a 2-D FFT.

In contrast, the invention recited in Claim 23 *selects the filter from a set of filters on the basis of an estimated carrier to interference ratio*, wherein the estimated carrier is a wanted carrier power value at a frequency subcarrier and a time slot of a data symbol to be channel estimated and the interference value is an interference reference value.

The channel estimation suggested by the invention recited in Claim 23 is specifically designed to avoid interference problems in a cellular OFDM system. Li, however, does not disclose interference problems. In this regard, it is respectfully submitted that Li is completely silent about the structure of the filter. In fact, the outstanding Office Action conceded that Li does not teach or suggest a filter being selected from a set of filters based on the estimated carrier to interference ratio, and cited Mitra as describing this feature.⁵

The outstanding Office Action asserted that Mitra describes selecting a filter from a set of filters based on an estimated carrier to interference ratio, citing column 1, lines 66-67 and column 2, lines 1-2 of Mitra. Specifically, the outstanding Office Action appears to assert that the abbreviation “CIR” used in Mitra denotes the carrier to interference ratio.

³See Li, column 4, line 53 to column 5, line 5.

⁴See Li, column 5, lines 6-15.

⁵See the outstanding office action at page 4, lines 17 and 18.

However, column 1, lines 28-31 of Mitra clearly describes that “CIR” is used to denote the *channel impulse response*. Even assuming *arguendo* that column 1, line 66 to column 2, line 2 of Mitra describes a variable filter where the coefficients of the filter are taken directly from the estimated channel impulse response, Mitra does not teach or suggest the use of an *estimated carrier to interference ratio* for selecting a filter from a set of filters.

Thus, it is respectfully submitted that neither Li nor Mitra teaches or suggests “a filter” as defined in Claim 23. Consequently, Claim 23 (and Claims 24-26 dependent therefrom) is patentable over Li in view of Mitra.

Claim 27 recites in part:

performing, by a filter, a channel estimation for data symbols between pilot symbols, *said filter being selected from a set of filters on the basis of an estimated carrier to interference ratio*, the estimated carrier being a wanted carrier power value at a frequency subcarrier and a timeslot of a data symbol to be channel estimated, and said interference value is an interference reference value.

As noted above, neither Li nor Mitra teaches or suggests selecting a filter from a set of filters on the basis of an estimated carrier to interference ratio. Therefore, it is respectfully submitted that neither Li nor Mitra teaches or suggests “performing, by a filter, a channel estimation for data symbols between pilot symbols” as defined in Claim 27. Consequently, Claim 27 (and Claims 28-30 dependent therefrom) is also patentable over Li in view of Mitra.

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Accordingly, the pending claims are believed to be in condition for formal allowance.
An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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